

THE NATURE CONSERVANCY NEWS

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SPECIAL ISSUE:
PRAIRIES



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THE NATURE CONSERVANCY NEWS

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COVER PHOTO: Phragmites grass in North Dakota prairie wetland, by Jim Brandenburg.

INSIDE COVER PHOTO: Little bluestem grass, Hoosier Prairie, Indiana, by Jim Brandenburg.

LAND CONSERVATION THROUGH PRIVATE ACTION

The Nature Conservancy is a national conservation organization, receiving its support from the public, whose objective is to preserve and protect ecologically and environmentally significant land and the diversity of life it supports.

To achieve this goal, the Conservancy purchases lands using its revolving fund which is then replenished through fund raising; accepts gifts of land; retains and provides stewardship for 60% of all projects; works with local, state, and federal governments to identify and protect important natural areas and acquires and manages land in advance of government agencies' ability to do so.

Some 1,127,960 acres of forests, swamps, marshes, prairies, mountains, beaches, and islands in 1,806 projects throughout the United States have been saved from destruction by the Conservancy since the acquisition of its first preserve in 1954.

A member-governed non-profit organization, The Nature Conservancy was incorporated in 1951 in the District of Columbia for scientific and educational purposes.

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Alabama

ALABAMA ROCK CITY (Cherokee County). The 200-acre area, located atop Lookout Mountain in northeast Alabama, contains an accumulation of enormous sandstone and quartz boulders, some of which measure approximately 100 feet long, 50 feet wide, and up to 90 feet high. The rock formations date to the Pennsylvanian Period of geologic time, some 300 million years ago, and contain numerous caves and shelters. Selected as an American Land Trust project, the area will be transferred to Cherokee County for use as a park.

California

DESERT TORTOISE PRESERVE (Kern County). Two tracts totaling 160 acres were purchased by the Conservancy at a bargain sale price with funds raised by the Desert Tortoise Preserve Committee. Part of an exceptionally diverse portion of the Mojave Desert ecosystem, the area supports a uniquely high concentration of the rare desert tortoise (*Gopherus agassizi*), along with the rare Mojave ground squirrel. The preserve also harbors several other protected reptiles, such as the banded gecko, desert iguana, long-nosed leopard lizard, desert horned lizard, and rosy boa. Over 160 species of vascular plants are found in the area. Management of the preserve will be the responsibility of the Southern California Chapter's Desert Tortoise Preserve Committee until it is transferred to the Bureau of Land Management to become part of the designated Desert Tortoise Natural Area.

NELSON NATURE PRESERVE — Addition — (Santa Clara County). A gift to the Conservancy from Mr. Frank C. Nelson, the one-acre tract is comprised of hillside meadow and woodland in the City of Saratoga. The area will be transferred to the California State Parks Foundation for inclusion in a park containing 5 acres previously donated by Mr. Nelson. The Nelson Nature Preserve is open to the public for recreation and education.

Florida

BIG CYPRESS—Addition—(Collier County). 646 acres were purchased by the Conservancy for the National Park Service as another addition to the Big Cypress National Freshwater Reserve. To date, the Conservancy has acquired 646 acres towards creation of the Reserve, which is a major watershed supplying the vast Everglades National Park with a constant flow of vital water.

MATANZAS PASS (Lee County). Located on Estero Island in the Gulf of Mexico, the 42-acre

property contains tidal mangrove swamp, grass ponds, and saltmarsh—ideal habitat for several endangered or rare animal species: American osprey, southern bald eagle, brown pelican, gopher tortoise, and indigo snake. Besides red, black, and white mangrove, the area supports live oak, myrsine, cabbage palm, saw palmetto, white stopper eugenia, and even a few gumbo-limbo—all plant species that are nearly extinct on Estero and other barrier islands. Twenty-two acres are a gift of John S. Dunning; the Matanzas Pass Project Committee of the Florida Chapter is fund-raising to purchase the remainder. The area is the only natural land left in the Fort Myers area.

HONORABLE THEODORE ROOSEVELT PRESERVE—Addition—(Duvall County). Donated by the Seaboard Coast Line Railroad Company of Jacksonville through the American Land Trust, the 176-acre area enlarges the preserve to 603 acres. The marshland lying near the St. John's River provides essential habitat for alligators and herons, in addition to hundreds of varieties of fresh and brackish water fish, salt marsh invertebrates, amphibians, and reptiles. Opossum, armadillo, squirrel, raccoon, otter, and bobcat are found in the area. Vegetation consists of hammock mostly made up of laurel, live oak, magnolia, and hickory with some cabbage palm and pine. The property has been leased to the Conservancy since 1968.

WALK-IN-THE-WATER CREEK NATURE RESERVE—Addition—(Polk County). The 2-acre tract, a gift of Dr. and Mrs. Bruce Newell, brings the size of the reserve to 11 acres. Vegetation consists of pine, hardwood, and palm forest along Weohyakapka Creek. Wildlife on the preserve includes wading birds, wild turkey, fox, and otter. The donors are responsible for managing the area.

WARREN CAVE (Alachua County). The longest known dry cave in the state, Warren Cave is a limestone cavern developed during the Sangamon interglacial stage of the Pleistocene Epoch. It contains several species of cave-dwelling animals, including the eastern wood rat, the yellow rat snake, the little brown bat, the cave cricket, and the blind crayfish (*Procambarus pallidus*), which is listed as endangered in Florida. Woodlands surrounding the cave are inhabited by deer, raccoon, armadillo, and bobcat. The 4-acre preserve, a gift of Mr. and Mrs. Richard E. Cox, will be transferred to the Florida Speleological Society for management.

Georgia

DIXIE STEVENS PROPERTY (Dawson County). Surrounded on three sides by U.S. Forest Service lands, the property contains a feeder trail that runs from the Amicalola Falls State Park to Springer Mountain—a takeoff point for the Appalachian Trail. The 41-acre area contains mainly hardwoods and pines, with a great diversity of flora: ferns, orchids, trilliums, and violets. Plants considered rare or at the edge of their range include bloodroot, ginseng, soapwort, rich weed, and grass of Parnasis. Up to 150 species of resident and migrant birds have been recorded on the property. The land will be managed by the Chatahoochee National Forest Supervisor and the U.S. Forest Service.

Illinois

GENSBURG-MARKHAM PRAIRIE—Addition—(Cook County). The Illinois Chapter purchased a ½-acre tract for addition to this prairie preserve located just south of Chicago. Located on a glacial lake plain, the prairie contains a unique combination of black and sandy soil that supports two separate and distinct types of prairie vegetation. The entire preserve, which now totals 93 acres, is scheduled for ultimate transfer to and management by Northeastern Illinois University.

Indiana

MORaine NATURE PRESERVE—Addition—(Porter County). The 79-acre area connects the two parts of the existing preserve and includes deep wooded gorges not present on the original area. Vegetation on the new property includes red maple, sugar maple, hickory, beech, tulip, oak, walnut, and a wide diversity of other species. The property will be transferred to the Indiana Department of Natural Resources for administration by the Division of Nature Preserves, and for inclusion in the existing Moraine Nature Preserve.

Iowa

CROSSMAN PRAIRIE (Howard County). The 10-acre area is a remnant tallgrass prairie of lowland areas, dominated by bluejoint grass, sloughgrass, and big bluestem. Major attractions are native orchids, such as yellow ladyslipper and showy orchis. Donated to the Conservancy by Mr. Glenn Crossman, the prairie will be managed by the Iowa Chapter.

Kansas

KONZA PRAIRIE—Addition—(Geary County). Described as the most generous single private gift ever made in the history of Conservancy con-

servation efforts, an anonymous donation of \$3.6 million was received in cooperation with the American Land Trust to purchase the virgin tall-grass Konza Prairie. The 7,200-acre preserve lies in the heart of the most extensive remaining tall-grass prairie region in the country, the Flint Hills. Plant life totals over 300 species. Red-tailed and Swainson's hawks hunt above the prairie, while prairie chickens, upland sandpipers, and meadowlarks all nest in the tall waving grasses. Konza has been leased to Kansas State University to be managed as an addition to the 916-acre Konza Prairie Research Natural Area purchased by the Conservancy in 1971.

Maine

SUCKER BROOK WATERSHED, Sabra's Creeper Hill Preserve — Addition — (Oxford County). Primarily woodland, the property borders Kezar Lake on its east side, where the woodland gives way to a large aquatic plant and shrub marsh. The marsh provides habitat for moose, geese, and a variety of waterfowl species. The Conservancy received the remaining 3/10 undivided interest in the 65-acre preserve, which was donated by Dr. Richard Krock and Mrs. Barbara Krock.

Maryland

BLACKWATER REFUGE — Addition — (Dorchester County). Purchased under the auspices of the American Land Trust, the 1,680-acre area on the eastern shore of the Chesapeake Bay contains the best American bald eagle nesting area left unprotected in the entire Bay area. The property is also home for two other endangered species, the Delmarva fox squirrel and the red-cockaded woodpecker. Peregrine falcons have been sited on the tract as well. Bordered by the Blackwater River, the area consists of biologically productive Eastern Shore wetlands and stands of timber. Of particular note are large loblolly pines with diameters of more than two feet. The tract was acquired in cooperation with the U.S. Fish and Wildlife Service and will be added to the existing Blackwater National Wildlife Refuge.

Michigan

HOLLOWAY RESERVOIR—Addition—(Genesee and Lapeer Counties). An area totaling 58 acres was purchased by the Conservancy for inclusion in Holloway Reservoir, which now totals 1,246 acres. Due to the presence of a number of soil types, the area has an exceptional diversity of plants and shrubs, as well as a blend of northern and southern tree species.

New Hampshire

STAMP ACT ISLAND (Carroll County). Situated in the middle of Lake Wentworth, the 100-acre island belonged to Governor John Wentworth, the last colonial governor of New Hampshire. The pines on the island were cut and used for masts on British war vessels during the pre-Revolutionary War era. However, uninhabited for many years, the island is now densely forested with white birch, beech, red oak, white pine, red maple, yellow birch, hemlock, tupelo, and black alder. The island is the home of a long-established great blue heron colony. Other birds include loons, common mergansers, mallards, black ducks, pileated woodpeckers, least bitterns, yellow-bellied sapsuckers, and yellow-shafted flickers. Management of the land will be the responsibility of the Lake Wentworth Association, a project committee of the Conservancy.

New York

DAVID WELD SANCTUARY—Addition—(Suffolk County). Consisting of woodland and open meadow, the 3-acre tract has a small stream running through it. Its northerly boundary has a high bluff with sandy beach frontage on Long Island Sound, conforming with the balance of the Conservancy's property to the east. Donated by Mrs. David B. Weld, the additional tract brings the size of the sanctuary to 83 acres.

Ohio

BECVAR NATURE PRESERVE (Geauga County). Donated by Mrs. E. H. Becvar, the 68-acre property has outstanding diversity due to the presence of slopes, both coarse and fine-textured soil types, seepage areas, dry banks, and open areas. Notable tree species include sweet birch, yellow birch, cucumber tree, and black ash. Descending into Winterbrook Creek, tulip, black walnut, shagbark hickory, magnolia, and basswood comprise the canopy. There is also an old-growth secondary red maple-tulip-black cherry-white ash forest, which covers the ridge between Griswold Creek and Winterbrook Creek. The preserve will be transferred to the Geauga County Park District for administration as a county park.

ABNER HOLLOW PRESERVE — Addition — (Adams County). Approximately 190 acres of the 200-acre area are covered with mixed mesophytic and beech-maple forest. A 2-acre promontory contains elements of prairie vegetation, such as golden seal, blazing star, downy rattlesnake-plantain, and walking fern. The property is habitat for the four-toed salamander and the green salamander (*Aneides aeneus*)—a species listed on Ohio's rare and

endangered list. To be managed by the Cincinnati Museum of Natural History, the additional property makes it possible to link together the Ohio Chapter's Adams County preserves. The Chapter is fund-raising to complete the project.

THE WILDERNESS (Charles A. Eulett Preserve)—Addition—(Adams County). An area of 9 acres, the property provides a buffer to the existing preserve, and enlarges it to 567 acres. The Wilderness, situated in rugged hills on the edge of the Appalachian highland, contains second-growth forest of chestnut oak and shortleaf pine associates. A National Natural Landmark, the preserve provides habitat for the rare green salamander and two rare plants—adder's tongue and canby's mountain lover. The addition will be managed by the Cincinnati Museum of Natural History.

WITHROW NATURE PRESERVE (Hamilton County). Acquired in a cooperative effort with the Hamilton County Park District, the 141-acre tract is an example of climax beech-maple forest located within a metropolitan area. Steep bluffs overlooking the Ohio River Valley afford spectacular views, and rugged and diverse topography offer excellent recreational opportunities within an urban setting. Dominant trees associated with the forest are dogwood, oak, hickory, black cherry, and ash. The diverse herbaceous understory contains wildflowers, spicebush, and ferns. The property will be transferred to the Hamilton County Park District.

Oregon

TILLAMOOK BAY ESTUARY (Tillamook County). The 150-acre area is a diked freshwater marsh adjacent to a saltwater marsh, which is an extremely valuable estuary and wildlife habitat. Bordered on the north by the Wilson River and a freshwater slough and on the south by the Trask River, the property is part of a long peninsula extending into Tillamook Bay. The bay is one of Oregon's best remaining undisturbed estuarine saltwater marshes. Donated to the Conservancy by Mr. Russell E. Hamachek, the land provides a buffer to the adjacent saltwater marsh and also serves as an outstanding migratory waterfowl and shorebird habitat. During fall migration, a large black brant population inhabits the bay, and many other species of geese and ducks use the wetlands. The property and surrounding areas are also important habitat for migrating peregrine falcons. Management of the area will be the responsibility of the Northwest Office.

South Dakota

VERMILLION PRAIRIE (Clay County). Lying equidistant between Vermillion and Yankton on a steep bluff overlooking the Missouri floodplain, the 22-acre prairie has escaped cultivation and is an outstanding representative of the type of tall-grass prairie that once occupied much of southeastern South Dakota. Native grasses are abundant, dominated by big and little bluestem, Indiangrass, switchgrass, prairie dropseed, and junegrass. Through the growing season, the prairie exhibits an everchanging display of wildflowers, such as lead plant, pasque flower, purple coneflower, thimbleweed, and various asters and goldenrods. The intriguing compass plant is also relatively abundant. Management of the area will be the responsibility of the University of South Dakota.

Texas

J. COOKE AND MARY RANDOLPH WILSON PRESERVE (Jefferson County). Donated by Mrs. Mavis Kelsey, the 40-acre property is an excellent example of a once-vast oak-loblolly pine forest. It contains a rich diversity of vegetation, including basket oak, Southern red oak, scarlet oak, black gum, sweet gum, southern magnolia, green ash, prickly-ash, white and red mulberry, loblolly pine, American holly, chinese tallow, arrowhead viburnum, maple leaf viburnum, yaupon, deciduous holly, French creeper, pepper vine, greenbriar, and willow oak. Management of the area will be the responsibility of the Texas Chapter.

Vermont

GREEN MOUNTAIN NATIONAL FOREST—Addition—(Windham County). A donation of Mr. and Mrs. Stephen Greene, the 100-acre area is heavily forested with mixed hardwoods and softwoods. Blueberries, lady slippers, and trilliums are common. The hilly terrain is crossed by streams and also contains unusual limestone/marble deposits. Bear, wildcat, raccoon, woodchuck, porcupine, and beaver inhabit the property. The area will be transferred to the U.S. Forest Service for inclusion in the Green Mountain National Forest.

Virginia

MASON NECK — Addition — (Fairfax County). Acquired for inclusion in Mason Neck National Wildlife Refuge, the terrain of the 14-acre tract is flat and covered with a mixed hardwood forest, similar in character to other areas previously acquired for the refuge. The refuge provides habitat for the endangered southern bald eagle. Management of the property will be the responsibility of the U.S. Fish and Wildlife Service.



Ordway Prairie, Minnesota

*Wild Plants in Flower is the name of a series of books, which contain color prints and a knowledgeable text dedicated to the vanishing American wildflowers in their natural habitats. The series carries a strong conservation message. Indeed, some of the books might not have come into being were it not for the effort to preserve areas from which the illustrations in the books were drawn. This is particularly true about the first book in the series: *Prairie Swell and Swale*.*

*The title, *Prairie Swell and Swale*, is derived from the prairie that spreads out on the shores of receding Lake Michigan. Many of the flowering species of this grassland are pictured in the book, along with a perspective on prairies in general, "What is a Prairie?", by Robert Betz. Dr. Betz is Professor of Biology at Northeastern Illinois University and a research associate in botany at the Field Museum.*

*The authors of *Prairie Swell and Swale*, Mr. Torkel Korling and Dr. Betz, had hoped that the conservation message carried in the text of the book would reach more people. But since the volume is temporarily out-of-print, the authors have kindly given permission to The Nature Conservancy News to reprint "What is a Prairie?" in its entirety.*

*The first printing of 37,000 copies of *Prairie Swell and Swale* was sold out in two years, with only local distribution. A new edition of the book is planned for early summer of 1977, with national distribution in mind. The second edition will be redesigned and will contain many new photographs of prairie flora. The Nature Conservancy News will be pleased to notify its readers of the new release of *Prairie Swell and Swale*.*

*John W. Humke, Vice President,
Midwest Region*



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What is a Prairie?

By Robert F. Betz

It is surprising how quickly the Midwestern prairies disappeared after the coming of the settlers, and even more surprising that any prairie flowers still survive after nearly a century and a half of plowing and overgrazing. The hundreds of thousands of square miles once prairie, comprising most of the Middle West, are recognizable today only as "farmland." The destruction has been so complete that most of the farmers in this vast region have never seen a virgin prairie. Most prairie plants are so rare or uncommon today that field guides published to aid amateur naturalists in identifying plants do not even mention them.

The word "prairie" was taken directly from the French, and means "meadow". Originally, it seems to have been a corruption of the Latin *pratium*, presumably a treeless, grassy tract within the Mediterranean oak-pine forests. The first Europeans to see the large grasslands at the south end of Lake Michigan, near the present city of Chicago, were the French explorers who had access to the interior by way of the St. Lawrence and Great Lakes chain. Having no other experience of such expanses of grassland, they used their word for "meadow," i.e. *prairie*.

Almost three hundred years after the first French explorers described them, these prairies are only a memory. But still the word lingers on in the English language to describe any open treeless area, even though it may have no native plants, and be covered with non-prairie grasses and weeds introduced from Europe and Asia. To some, "prairie" means a vacant lot between houses; to others it is the open land of our Western States.

While most botanists and ecologists know fairly well what a prairie is and can easily recognize one, there is no agreement on a definition. One ecologist defines it as "an extensive tract of level or rolling land, destitute of trees, covered with coarse grass, and usually characterized by a deep fertile soil." Another calls it "the grassland dominated by the tall prairie grass, as distinguished from the short grass plains." Although it is difficult to find a definition satisfactory to all ecologists, it is possible to describe a prairie in a general sense as *a natural North American grassland, composed of native perennial grasses and other herbaceous plants, in which the grasses contribute much of the vegetative cover.*

In fact, some relic prairies are very small in size—a fraction of an acre in an old settler cemetery, a short stretch along a railroad right-of-way or a tiny patch in the corner of a farmer's field. The term "prairie" then is still valid when it applies to those very rare relic grasslands, no matter how small, which have never been plowed or overgrazed. In short, these are remnants of the grasslands on which the Illinois, Kickapoo, and Miami Indians roamed and hunted the bison. Prairies of this nature, untouched by plowing and overgrazing and in their pristine state, are called *virgin prairies*. Prairies which have been modified in some way by man or his domesticated animals and which contain both prairie plants and introduced weedy plants are known as *degraded prairies*.

While the prairies described in this issue of the *News* are primarily the *tallgrass* or *true prairies* of the eastern midwest and the *mixed-grass prai-*

ries of the high plains, it should be understood that there are other types of prairies in North America. There are prairies in the Pacific Northwest (*palouse prairies*), California (*valley grassland*), on the Texas coast (*coastal prairies*), and even in the arid Southwest (*desert plains grasslands*).

Outside of North America and on every other continent there are grasslands similar to our North American prairies. Each has a different name. In Eurasia they are known as *steppes*, while in South America they are collectively called *pampa*. South Africa has its *veld*, Australia its *basalt plains*, and New Zealand its *tussock grasslands*.

Climate, Fire and Soil

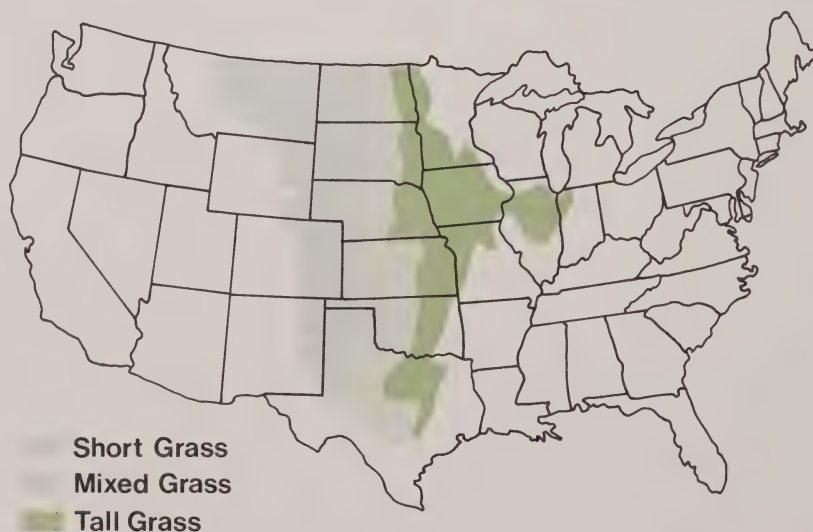
Contrary to what has been suggested in some scientific texts, the presence of grasslands in the Middle West cannot be explained in terms of climate alone. There probably is no true "prairie climate." While hot summers and cold winters are the rule throughout the prairie region, with heat waves of over 90 F. and cold waves below zero not uncommon, this temperature regime is matched in other parts of North America. The total annual precipitation would even lead one to expect a forest region, as many parts of the Middle West receive more moisture than do many forested parts of western Europe. Probably more important to the existence of the prairies is the tendency to have periods of drought during the summer. But this in itself cannot account for the

presence of the prairies, inasmuch as many forested regions elsewhere have similar drought conditions.

Even though prairies grow in this climate, trees and other woody plants also thrive. Prairie groves containing maple, oaks, and ash, many square miles in extent, were an integral part of the pre-settlement prairie landscape. Today hawthorns, wild cherries and dogwoods invade uncultivated fields, while introduced trees and shrubs do well when planted—in fact, just as well as they do in other forested regions of North America. It appears then that there are probably very few climatic differences between the forest and prairie regions.

Why, then, were prairies found in the Middle West? The reason, presumably, was the presence of *fire*. The relatively flat ground, occasional drought, accumulation of dry litter and high winds at certain seasons of the year all combined to foster fires. Indians set many of these fires, but some probably had a natural origin. With fire as an ally, coupled with winds blowing toward the east, the prairie vegetation was able to maintain itself in lands that otherwise would have been forested. In managing and caring for relic prairies, it has been found that fire does not injure the *true* prairie plants, especially when burning takes place after they have died back in the fall. In contrast, the few tree seedlings that might establish themselves in the dense prairie sod are killed by prairie fires.

Original Range of Major Prairie Types in the U.S.



Although there appears to be very little difference between the *climates* of the Midwestern prairie and the Eastern forest regions, *soils* developed under prairie vegetation are much different than those formed under forest vegetation. These prairie soils, known as *brunizems* or, according to a more modern classification, as *udolls*, have a deep black or dark brown top layer which gradually merges into the subsoil below. Most of the virgin prairie remnants have fourteen to eighteen inches of top soil; while the top soil in surrounding cultivated fields frequently averages less than ten inches. This would indicate that six inches or more of top soil have eroded away since the introduction of farming.

The Composition of the Prairies

To the uninitiated, the idea of a walk through a prairie might seem to be no more exciting than crossing a field of wheat, a cow pasture, or an unmowed blue-grass lawn. Nothing could be further from the truth. To see a virgin Illinois prairie in the spring of the year covered with golden Alexanders and pink shooting stars; or to view the mid-summer prairies blanketed in graying lead plants mingling with the wispy-awned porcupine grass; or, in autumn, to behold the tall waving expanse of big bluestem grass bedecked with asters, goldenrods and gentians, are all unforgettable sights.

Over two hundred different species of plants have been found on the Midwestern prairies. Most grow on the relatively flat or slightly undulating *mesic prairies* with good drainage. Smaller numbers are confined either to the excessively well-drained *dry prairies* of rocky and gravelly knolls, to *sand prairies*, or to the poorly drained *wet prairies* or *swales*. A few species are limited to the wet *alkaline fen prairies* found in low areas adjoining limestone bluffs or moraines containing limestone. Although each species of prairie plant tends to grow in a particular type of prairie, some also do well in the other kinds of prairie, and it is not uncommon to find a few specimens of the *mesic prairies*, for example, thriving in a wet prairie.

More than forty-five different plant families are found on the prairies. Many of these families are represented by only one or two species, others by a half dozen or more. The sunflower family (*Compositae*) with its various asters, sunflowers, goldenrods, cone flowers and blazing stars, has the largest number. The grass family (*Gramineae*) and pea family (*Leguminosae*) are also well represented on the Midwestern prairies.

With few exceptions, the prairie plants are relatively long-lived perennials. While the upper parts



Black-eyed susans, Osage Prairie, Missouri

die back to ground level each autumn, the roots remain alive. There is indirect evidence that many prairie plants live for decades, or even centuries, just like the towering trees of an old forest. With the severe competition for light, water, and nutrients that occurs in the dense growth of the virgin prairies, it is advantageous for plants to maintain themselves year after year, rather than to start growth each spring as seedlings and then compete against well-established plants.

Weedy plants do not ordinarily occur on virgin prairies. It is only on degraded sites that weeds are found, the numbers and kinds depending on the degree and nature of the degradation. Given time, if man does not interfere, the prairie plants in degraded prairies can usually out-compete and eventually drive out weedy invaders.

Prairie grass, it has been frequently repeated, was originally found growing "taller than a man on horseback." Or, "the settlers' cattle were lost amid the prairie grasses." These reports do not agree with the more reliable historical accounts, or with observation of our best prairie remnants. While native grasses on low prairies with their great available moisture do reach heights of six feet or more, most of the late-season grasses are only half that tall.

The height of wildflowers blooming among these grasses may be observed to increase as the season

progresses. Plants blooming in the early spring are usually less than a foot in height; some, like the yellow star-grass (*Hypoxis hirsuta*), only a few inches. By late summer, the prairie reaches the peak of its development, with most of the plants in flower standing three or four feet tall. Some plants, like the prairie dock (*Silphium terebinthinaceum*), reach heights of over six feet, towering in the surrounding sea of grass.

The Destruction of the Prairies

For thousands of years the Indians roamed the prairies of the Middle West, probably doing little permanent damage to the vegetation. Their cultivated fields were along the floodplains of rivers and streams, since it was much easier to dig and hoe in the soft alluvium than in the prairie sod with its dense tangle of roots. The little digging they did on the prairies was to obtain the roots and corms of prairie plants needed in medicinal potions, drinks, and dyes. Around Indian encampments, some of these useful plants may have been collected so heavily as to be exterminated. Trampling by man and his animals around villages and hunting camps could also have been destructive. However, when the villages and encampments were abandoned, the vigorous prairie vegetation would quickly become reestablished and cover the ground.

While the Indians did little damage, the coming of the early settlers to the Middle West during the Nineteenth Century presaged the end of the prairies. The primeval vegetation that had occupied the land for thousands of years was to be destroyed and the land planted with man's cultivated crops.

The first settlers to the prairies were the rugged backwoodsmen from Kentucky and Tennessee—descendents of the Scots-Irish immigrants from Northern Ireland. They were primarily forest people who knew how to clear out timber, erect log cabins, build rail-fences and make household utensils out of wood. True to their tradition, they stayed near the groves found on the prairies or the timber along the rivers. The open prairies were to them an alien environment, offering no wood, no protection from storms, and in some cases, no water. There was also a suspicion that soil that did not support trees was not good agricultural land; this was soon found to be untrue.

With the defeat of the Sauk and Fox Indians in the Black Hawk War of 1832, the last organized Indian resistance to settlement of the prairies disappeared. Gradually the thin line of settlers living on the edges of groves or river timber moved out onto the prairies. In addition, with the completion of the Erie Canal in 1825 and the subsequent

development of steamship navigation on the Great Lakes, an all-water route from the East to the Middle West was opened. Soon Yankee farmers from New England and Germans from the Rhineland were disembarking at the ports of Chicago and Milwaukee and pouring out on the virgin prairies.

One of the many problems confronting these prairie farmers was the breaking of the tough prairie sod in the preparation of the soil for the planting of their crops. To "break prairie" a special plow was needed, mounted on wheels and with a wooden moldboard. Some were so large that eight to ten yoke of oxen were needed to drag them through the unbroken sod. Professional prairie breakers charged more per acre than the \$1.25 farmers paid for the land itself.

Once the prairie had been broken and sown to crops, the prairie farmers had another problem. Subsequent plowing of the broken prairie was made difficult by the stickiness of the rich prairie soil which clung to the moldboard of the plow. Even iron plows brought in from the eastern states would not "scour" in the prairie soil, i.e., they were not self-cleaning when in use. It was necessary to have a man run alongside the plow and scrape the prairie mud off the moldboard with a small paddle. This problem was finally solved with the invention of the steel-moldboard plow.

While plowing destroyed most of the prairies, some were ruined by overgrazing. For thousands of years these prairies had been grazed by herds of bison and other wild animals, with little injury. Most of the grazing by these wild creatures was widespread and intermittent, enabling the prairie plants to recover from having their aerial parts eaten off. But when large numbers of domestic animals were confined in fenced prairies, the prairie plants were killed by the continuous grazing and trampling. When this happened, the prairie farmers said that the prairie was "grazed out."

The Preservation of Prairies

With the increase in the human population and the introduction of better plows, most of the better-drained prairies had been destroyed before the Civil War. Poorly drained wet prairies and prairie fens lasted a little longer, but with the introduction of drain tile toward the end of the Nineteenth Century, even these were plowed and planted to crops and pasture grasses.

After one hundred forty years of farming there are very few prairies left in the Middle West. The largest remnants are found in eastern Kansas and Nebraska. Because of very shallow rocky soils in the Flint Hills of eastern Kansas, thousands of acres of prairie have never been plowed, but are



The long-billed curlew, a grassland nester, is now threatened over much of its former range.

still used for grazing cattle. Smaller tracts in the same region are used as "prairie hay meadows" and are mowed annually.

Remnant prairies can also be found along a few fenced railroad rights-of-way. Other small bits of prairie around farms may have remained unplowed because they were protected by a natural barrier, such as a creek or marsh. Very fine prairies have survived in some old settler cemeteries which were originally staked out on the open prairies. As the prairies surrounding the cemeteries were plowed and overgrazed into oblivion, the prairies within the cemeteries survived. Prairies are also found in some suburban areas of large cities, having escaped use for farmland or building sites because of the lack of clear titles or the difficulties in tracing owners or their heirs.

Each year many of these prairie remnants are being destroyed. Some are plowed up and planted to crops, others are sprayed with herbicides. Many of the larger prairies are being ruined by overgrazing; the smaller ones by continuous mowing. It is regrettable that so little effort is being made to preserve them. It has been through the initiative of a relatively few individuals and conservation groups that some remnant prairies have been saved. While the Federal and State governments have not usually taken the lead in preserving relic prairies, they have helped considerably in their purchase and acquisition.

Since so little prairie remains in some parts of the Midwest, efforts are being made to *reestablish* prairie on abandoned farmland. Seeds are collected from nearby prairie relics and planted in protected areas, either by hand or by use of an agricultural seed drill. The results of projects by the University of Wisconsin at Madison and the Morton Arboretum, Lisle, Illinois, show that with hard work and luck (such as sufficient rainfall at the time of planting) fairly good prairies can be established within a few years on suitable land.

It is surprising how little is known about the natural world, especially with regard to degraded and polluted environments. In order to carry out meaningful research in this area, it is necessary to have relatively natural landscapes, such as virgin prairies, forests, and deserts, to serve as standards to evaluate the changes that have occurred elsewhere and their effects on men and other biological organisms.

Even if there were no scientific values in a prairie, its aesthetic appeal alone would warrant its preservation. It is one of our links with the past—a tie with the natural world. It seems immoral to destroy an integral and important part of the biological world from which mankind arose.

In our modern world with its artificiality, complexity and instability, wild prairies can provide us with places to go for peace and solitude. For this alone, prairies should be preserved and cherished.



Bobolink, Iowa

Saving Pieces of Prairie

By R. Newell Searle

Most midwesterners know it is spring when their lawns turn green, and the first robins carol from the trees. A few fortunate individuals learn of spring's arrival from the pale lavender pasque flowers pushing through last year's dead grasses, and the booming of courting male prairie chickens in the dawn's dim light. The Nature Conservancy, with the assistance of dedicated citizens, is saving the remaining pieces of our wild grasslands, so that pasque flowers and prairie chickens will still be there to tell us when it is spring.

Prairies originally stretched upward from northern Texas into Canada and ranged from Ohio westward to Oregon and southward to Arizona. Now, except for a few fragments, these great grasslands are gone. The prairies have been replaced by end-

less fields of wheat and corn, vast ranges where sheep and cattle graze, and sprawling cities linked by super highways and railroads. With the grasslands went the American bison, pronghorn antelope, a multitude of waterfowl, and prairie chickens.

Though these animals are threatened, one square mile of a Dakota grassland, for example, may still harbor a pair of coyotes, 185 jackrabbits, 700 plains harvest mice, 900 shrews, 650 million insects, and hundreds of bobolinks, pocket gophers, and badgers. If we don't save the remaining pieces of prairies, these creatures will disappear as well.

Unfortunately, Americans have been tardy in protecting their prairie heritage. Because the soil lying beneath the grasslands was the richest and

most fertile, plowing it up to grow corn, wheat, and other crops has always been encouraged by public opinion. The remaining grasslands are now so few and scattered, that using them for agricultural production would add little to the nation's well-being, and would eliminate irreplaceable fragments of our natural heritage.

Our awakening interest in prairies is contradicted by the intense pressure for developing land. In Minnesota alone, eight prairies that the Conservancy was unable to purchase were destroyed in less than six years' time. One was turned into a cornfield, one planted with Christmas trees, another scalped for sod to stabilize a road cut, two mined for gravel, one turned into an industrial park, and the finest bought by speculators and offered for development at outrageous prices.

Under the dark cloud of these day-to-day constant threats, there has been little time for drafting detailed, long-range acquisition plans. Thus, the Conservancy and its Midwest Regional Office have given immediate attention and highest priority to acquiring native grasslands in good condition. When it comes to saving land, opportunity knocks only once. If the chance is ignored, the land is lost.

The Conservancy also tries to secure as many different types of prairie as possible. From eastern Ohio to central Nebraska, from northwestern Minnesota to southwestern Missouri, prairies form distinct, separate types, depending on the various soils, topographies, and changing climates. Taller big bluestem and shorter grama grasses provide a green backdrop for colorful blazing stars, unusual compass plants, heath aster, sunflowers, purple prairie clover, and several hundred other species of plants.

To date the Conservancy has saved over 36,000 acres of midwestern grasslands. Preserving these pieces of prairie averts the destruction of uncommon or rare plants and animals, provides scientists and schools with outdoor educational centers and research laboratories, and secures inspiring and vital samples of the original landscape for future generations.

Gifts, purchases, and leases are three methods for saving grasslands. There are no routine purchases; each case demands its own tailor-made tactics. Although the Conservancy is foremost in saving prairies, it often acts in concert with other citizens, garden clubs, foundations, state departments of natural resources, or universities to preserve grasslands.

Iowa, famous for its corn fields, was once mantled with tall grasses. The Ames School Prairie is one of the few pieces of grassland left in central Iowa. It was a parcel of 30 acres when the city of

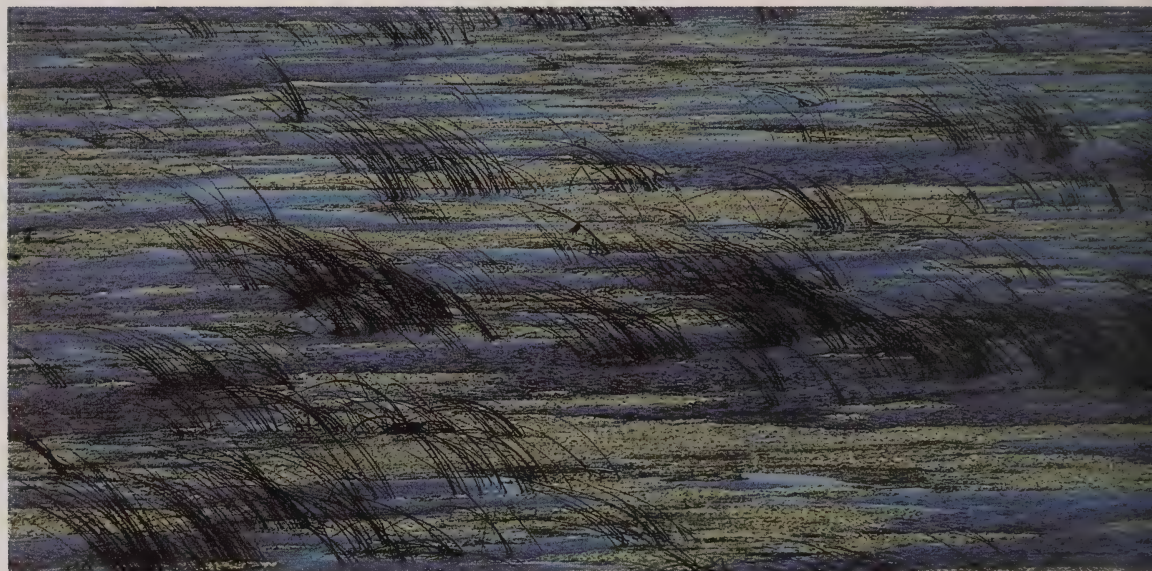
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Santee Prairie, Minnesota



Mammalaria cactus



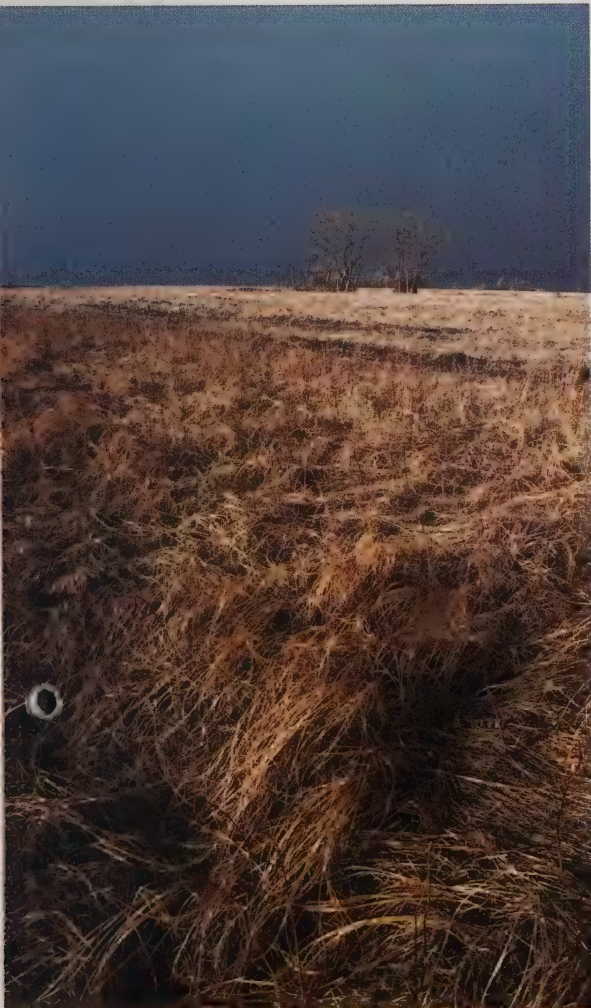
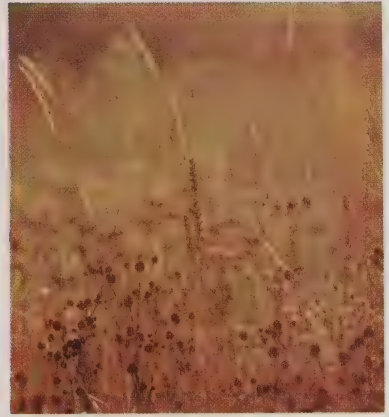
*These are the gardens of the desert, these
The unshorn fields, boundless and beautiful,
For which the speech of England has no name—
The Prairies.*

— William Cullen Bryant





Photos by Jim Brandenburg



Clockwise from top left: compass plant, pasque flowers and horned lark nestlings, avocet on North Dakota prairie wetland, dropseed grass, Iowa; gentian, Hoosier Prairie, Indiana; Blazing Star prairie, Minnesota; greater prairie chicken, prairie slough, Ordway Prairie, South Dakota



Konza Prairie, in the Flint Hills of Kansas, is the largest unit in the Conservancy's Ordway Prairie System.



The Franklin's ground squirrel is one of a variety of burrowing prairie rodents.

Ames bought it in 1956. After a new school was built, 18 acres remained undeveloped. The fate of the little prairie was clouded until citizens, teachers, and the newspapers realized the educational and symbolic importance of the grassy fragment. A campaign to preserve it began in 1967, and climaxed in 1970 when the citizens of Ames voted for preservation by leasing the prairie to The Nature Conservancy for 49 years. Iowa children now have a unique classroom just outside their school windows.

While preservation removes some grasslands from agricultural production, many other interests benefit as well. For years ranchers of eastern Kansas have disagreed among themselves about whether or not their ranges are as productive as they were a century ago. Research being conducted on a Conservancy prairie preserve may soon answer that question and others.

In 1967 faculty member at Kansas State University (Manhattan) identified the land they wanted for use as an outdoor laboratory—a native upland prairie, in good condition, with varied topography, having a fine representation of soil types, and large enough for both plant and animal studies. Called Konza Prairie, the spacious grass-

land sweeps across the long ridges of the Flint Hills and is the largest unit in the Conservancy's Ordway Prairie Preserve System. Its mosaic of bluestem grasses and sunflowers provides habitat for red-tailed and Swainson's hawks and ground squirrels.

After an initial purchase of 916 acres in 1971, the Conservancy received an anonymous donation of \$3.6 million to buy an adjacent ranch, which enlarged Konza to 8,116 acres in 1977. Both acquisitions were timely. Not only is suburban Manhattan growing rapidly, but also the cost of prime grazing land is increasing, and ranchers want more productive pastures. As a result, thousands of acres of the Flint Hills' bluestem and grama grasses have been plowed and seeded to non-native species, or sprayed with herbicides to kill broadleaf plants and forbs (flowering herbs) in the hope of increasing grass production.

Leased to and managed by Kansas State University, Konza Prairie Research Natural Area is being used to study the slower, less dramatic, but often more significant ecological changes in the environment. The Kansas grassland provides a natural benchmark for comparing the fertility of undisturbed soil with that of cultivated soils and grazed pastures. Some day we will know if the Flint Hills ranges are as productive as they once were.

Like Konza, the Samuel H. Ordway, Jr., Memorial Prairie near Aberdeen, South Dakota, serves as a research station to study grassland preservation and restoration. Acting on a suggestion from the U.S. Fish and Wildlife Service, the Conservancy bought the 7,600-acre prairie in 1975. The tract encompasses more than 400 wetlands lying atop the rolling Coteau du Missouri, a moraine that runs through North and South Dakota. About 2,000 pairs of waterfowl breed there, including mallards, cormorants, bitterns, phalaropes, and upland sandpipers. Fortunate visitors may also see the endangered ground-nesting ferruginous hawk, small flocks of white pelicans, and the short-eared owl, or glimpse a few of the wary pronghorn antelopes that form the only free-ranging herd east of the Missouri River. Ordway Prairie is a remnant of the sparkling wetlands and lush grasslands of the north-central U.S., which have been reduced to a fraction of their original size and productivity.

Some inhabitants of the prairie world—burrowing owls, marbled godwits, and prairie falcons—may soon be extirpated from much of their original range. But no threatened prairie species has captured as much public interest as the greater prairie chicken—the plump bird that inflates its yellow-orange air sacs and sends his mating call booming across the grasslands. The prairie chicken



White pelicans, Samuel Ordway Prairie, South Dakota

flourished until a century ago, then gradually declined as the amount of cropland exceeded the amount of grassland. Though locally common in parts of Kansas, Nebraska, and the Dakotas, only several thousand remain in Michigan, Minnesota, Wisconsin, Illinois, and Missouri.

For many years the Conservancy has worked closely with conservation departments and organizations in several states to save remnant prairie chicken populations. In Illinois, for example, the Illinois Natural History Survey and the state's Department of Conservation joined the Conservancy to acquire significant tracts of cropland critical to the state's remaining chickens. Meanwhile, in cooperation with the Missouri Department of Conservation and the Missouri Prairie Foundation, the Conservancy is attempting to preserve as much as possible of the remaining native tallgrass prairies in a 12-county area of the state. The Conservancy now owns 11 preserves, comprising 3,408 acres. Most are managed by the Missouri Department of Conservation and contain resident populations of prairie chickens. Osage Prairie, near Liberal, Missouri, also harbors the upland sandpiper, a rare species in the state.

In Minnesota the Conservancy owns and manages more than 9,000 acres of grasslands, much of it in and around the Red River Valley. Upland and lowland tracts of these prairies protect booming and nesting grounds for the 4,000 birds still in the state. This autumn some prairie chickens will be



The Ordway Prairie Preserve System

The Ordway Prairie Preserve System was created in 1971 to preserve as much as possible of our remaining grasslands in several states. In 1972 the system contained only six prairie preserves. Today it contains 20 sanctuaries. The prairies listed below are a tribute to the Conservancy's endeavors and to the assistance of its members and volunteers in preserving our great, dynamic grasslands.

Missouri

Osage Prairie (1,195 acres)
Tzi-Sho Prairie (240 acres)
Monegaw Prairie (180 acres)
Pawhuska Prairie (77 acres)
Little Osage Prairie (80 acres)
Hunkah Prairie (160 acres)
Wah-Sha-She Prairie (160 acres)
Niawathe Prairie (80 acres)
Wah'Kon Tah Prairie (640 acres)
Moko Prairie (416 acres)
Thoresen III Prairie (180 acres)

Minnesota

Ordway Prairie (582 acres)
Wahpeton Prairie (80 acres)
Chippewa Prairie (729 acres)
Santee Prairie (448 acres)

Kansas

Konza Prairie (8,117 acres)
Flint Hills Prairie (2,188 acres)

South Dakota

Samuel H. Ordway, Jr., Memorial Prairie
(7,600 acres)
Sioux Prairie (200 acres)

Nebraska

Pawnee Prairie (320 acres)

released 100 miles south of the Red River Valley, on the Conservancy's Chippewa Prairie, where the Department of Natural Resources hopes to re-establish the endangered animals.

Prairie plants, no less than animals, are threatened with eradication from their natural range. By preserving grassland remnants, regardless of size, the Conservancy helps perpetuate natural diversity of environments and species. Lynx Prairie, for example, is a precious parcel in southeastern Ohio. Although it is a mere 53 acres, Lynx is significant because it lies hundreds of miles to the east of the main prairie region. A relic of a warmer, drier climate that existed 3,000 to 5,000 years ago, the prairie harbors 250 species of plants, including such rare types as Texas sandwort, crested coral-root, blue-hearts, crane-fly orchid, dwarf hackberry, and spotted wintergreen. These species are found nowhere else in the state.

Another priceless prairie lies in Markham, Illinois, within the shadow of Chicago's skyscrapers. Gensburg-Markham encompasses 93 acres of grasslands on soils that formed on the bed of glacial Lake Chicago. It has both deep, alkaline soils, and strips of acidic sands, with plant life restricted to each soil type. Prairie dock, valerian, and colic root, in addition to bob-white quail, the green prairie snake, and the regal fritillary butterfly, are rarely seen in this section of Illinois, but populations of them persist on Gensburg-Markham Prairie.

The story of preserving Gensburg-Markham underscores the special role the Conservancy often plays. The tract was subdivided but undeveloped when it was "discovered" in 1963. No public agency would preserve it, so people from Markham, faculty members for Northeastern Illinois University, and others acted in concert to protect the tract. More than 40 people owned parcels of the prairie, and buying them required money, patience, and expertise. Working with Northeastern Illinois University, the Conservancy secured a 60-acre donation from the Gensburg family. The value of the donation was matched by funds from the Bureau of Outdoor Recreation in 1972, and the Conservancy has purchased an additional 33 acres from 36 owners.

The natural value of Gensburg-Markham cannot be overstated. Perhaps its greatest worth lies in its proximity to populous Chicago. In a half-hour, school children and adults can travel from the bluegrass and pigeon "ecology" of Chicago's Grant Park to the hundreds of wind-blown plants and secretive animals of Gensburg-Markham Prairie. For city-bound people, 93 acres hold infinite possibilities for the human spirit.

People who visit prairie preserves are probably most impressed with the vistas. Bluestem Prairie



Gensburg-Markham Prairie, a virgin grassland just south of Chicago, had been subdivided for development until Illinois conservationists and the Conservancy intervened.

near Moorhead, Minnesota, is a large preserve—1,200 acres—rolling along the fossil beachline of glacial Lake Agassiz. It is one of the few places where one can see nothing but tall grasses, moving and bending to the horizon. Spacious skies and rolling prairies are a part of the American heritage; and, symbolically, we may still see our future written across the open horizons of the western grasslands. Bluestem Prairie is a pioneers' vista in prairie chicken country.

Like William Keating, who crossed the region in 1823, visitors to Bluestem will see a "broad expanse of verdant prairie, spreading beyond the utmost extent of vision." The grasslands of the Red River Valley "have very little to interrupt the simplicity and uniformity of the scenery . . . save what is afforded by an optical illusion that makes the traveler fancy himself in the center of a basin, and surrounded by an amphitheater of rising ground at no great distance, which constantly eludes his approach."

From upland to lowland of Bluestem Prairie, the soils change from dry to moist, and among the more interesting plants are locoweed—a toxic plant—and buffalo bean, a legume used by Indians as a pot herb. Its edible fruits taste like fresh peas.

Unlike the mountains, forests, and sea coasts, the prairies have had few eloquent defenders. Willa Cather, the novelist from Red Cloud, Nebraska, understood the open grasslands, and gave them and herself immortality in *O Pioneers!*, *My Antonia*, and other novels set on the windy

divide of the Republican River in Webster County. Whenever Willa returned to Red Cloud, she delighted in hiring a buggy and driving out across the country until she found a patch of prairie where she could stand in the wind at the crest of a ridge.

For years the Willa Cather Pioneer Memorial and Educational Foundation has been trying to preserve the landmarks about which she wrote. Although many have been secured, Webster County is nearly shorn of its sweeping grasslands. In 1975 the Woods Charitable Fund provided money, and the Conservancy bought, and dedicated as a memorial to Willa Cather, a square mile of the finest remaining tallgrass prairie in Webster County.

Cather understood the shaggy land, the prairie chickens, and the pasque flowers. Her books preserve for posterity pieces of experience we will never know again. Willa, with her passion for the windy grasslands, would have understood the Conservancy's program to save the prairie. "The land belongs to the future . . . that's the way it seems to me," she wrote in *O Pioneers!* "We come and go, but the land is always here. And the people who love it and understand it are the people who own it—for a little while."

Editor's Note: R. Newell Searle is a free-lance writer and a trustee of the Conservancy's Minnesota Chapter. His help in putting together this special prairie issue of the *News* is gratefully acknowledged.

Stewardship: The Key to Prairie Preservation

By Gerald A. and Grace M. Lieberman



Preserving prairies must go beyond acquiring grasslands, and must include well-planned, intensive research and management programs to maintain the areas in their natural state. The problem was ably stated by Robert Jenkins, The Nature Conservancy's Vice President for Science. "It would be erroneous to infer that the prairie ecosystem is some sort of hot-house plant, unsuited to its environment and less vigorous than other systems." The problem is that human activity has "pushed the prairie to the wall, destroyed it over most of its original range, and disrupted the chain of events that sustained it." Meanwhile, defenders have often misunderstood the needs of prairies when they *have* tried to preserve them. If "a significant fraction of the grassland environment can be saved, then prairie could become once again a tough, competitive, and resilient system," Jenkins wrote. "Acquisition of suitable lands, coupled with inspired restoration, management, and research, can yet save the prairies for the time when we will need them again."

The Nature Conservancy owns over 36,000

acres of grassland in 12 midwestern states. Most tracts are predominantly tallgrass prairies, ranging in size from 5 to 8,100 acres. Although many of the parcels have common characteristics and similar needs, each requires individual planning, stewardship, and preservation. Prairie managers must consider the special needs of each tract, and design annual management plans.

Historically, grazing wildlife (bison and antelope), Indian-set fires, and drought helped maintain the prairie ecosystem. The diversity of grassland flora and the animals associated with it depends on many associated natural forces, rather than a single event. Carefully controlled burning, for example, is the best known method to simulate the natural forces that maintain a healthy, natural grassland. Periodic grazing and haying are also used to maintain the proper balance of grasses and to recycle nutrients in vegetation. To properly implement such techniques, managers must inventory, research, plan, and then develop programs employing one or a combination of these management practices. Each practice must be tailored to per-



Mark Heitlinger, the Minnesota Chapter's Coordinator of preserve management, conducts survey of prairie communities.

petuate the particular type of prairie vegetation that exists on the tract.

In order to develop both short- and long-term plans for preserving prairies, the Conservancy works closely with prairie experts from state and federal agencies, universities, and interested Conservancy members. The scope, techniques, and purposes of prairie management depend on the purpose of the preserve, and the agency responsible for its administration.

In some states, the Conservancy's prairies are leased to and managed by state agencies. In Missouri, the Department of Conservation, the Missouri Prairie Foundation, and The Nature Conservancy together own 8,000 acres of grasslands. A prairie specialist employed by the Department of Conservation has custody of state-owned grasslands, and other tracts leased from the Conservancy and the Missouri Prairie Foundation. Management begins with identifying and surveying the tracts, locating existing structures, mapping soils, plant communities, and their relationships to each other, and sampling animal species, noting



Prescribed burning is an important part of prairie stewardship.

any (like the prairie chicken) that are rare, or endangered, or that require special attention. The investigations enable the prairie manager to recommend protection policies.

Individual tracts are frequently cared for by academic or scientific institutions. Konza Prairie, the Conservancy's largest grassland, is leased to Kansas State University as a research station. A staff backed by an advisory board of nationally known ecologists was chosen to administer the preserve. Konza and other grassland preserves are manipulated to approximate and perpetuate the prairie as it existed before settlement. Scientific studies of the structure and function of the grassland ecosystem provide opportunities for comparative studies of other natural ecosystems versus man-made or disturbed ecosystems. Since 1971 prescribed fire and mowing have been important management tools and the subject of scientific study. The results could ultimately benefit the use and care of other prairies and range areas throughout the Midwest.

In South Dakota the Conservancy operates the

Samuel H. Ordway, Jr., Memorial Prairie Research Station on 7,000 acres of grassland and 400 wetlands. It is a full-time facility administered by a wildlife graduate with a specialty in waterfowl management. By good fortune he also has a ranching background: his experience and training equip him for running research programs that include comparing short-term heavy grazing with long-term light grazing, during different seasons, and with haying and resting. In addition, the Ordway preserve has facilities where researchers may live and conduct research and laboratory analyses. Konza and Ordway offer the scientific and ranching communities many opportunities for research, experimentation, and education.

Minnesota is one state where the Conservancy manages most of its preserves. The Minnesota Chapter owns 33 parcels of land totaling 9,100 acres. The tracts contain some forests and meadows, and a significant amount of prairies. A full-time coordinator of preserve management was hired in 1976 to protect the numerous preserves, conduct inventories, plan preservation, and implement the policies of the chapter's preserve management committee. The Minnesota coordinator also engages the assistance of ecologists, botanists, wildlife specialists, and many interested volunteers. Throughout the year, the coordinator must train volunteers and then evaluate their work. This year the Minnesota Chapter used a generous gift to develop a student intern program. It will provide

the necessary manpower and expertise to inventory and develop management plans for nine preserves, ultimately opening doors for new methods of research and management.

Although most of the Conservancy's prairies receive competent planning and care, it is important to continue research on management techniques. With several generous gifts from prairie enthusiasts, from foundations interested in preserving prairies, and from universities that have matched research grants, the Conservancy has sponsored prairie research. In addition, a consortium of prairie specialists is being drawn together to share ideas and techniques that will improve prairie management programs throughout the Midwest. New research must continue, and raising funds for it is as important as finding money for acquisition or stewardship.

The long-term care of the Conservancy's prairies requires the continuous assistance of scientists, educators, and willing volunteers from a variety of state, federal, county, and private agencies. Proper stewardship includes carefully controlled grazing, haying, burning, and resting; research and educational programs to increase knowledge of prairies; and, hiking, photography, nature study, and other forms of passive use. Continuing stewardship will provide future generations with the natural heritage that pioneer families experienced, and ensure the opportunity to explore the values associated with the prairie world.

Giant Canada Geese Released on Samuel Ordway Prairie

In a cooperative effort with the South Dakota Fish and Game Department, 64 giant Canada geese were released on the Samuel Ordway Memorial Prairie during the last week of April. They are the largest subspecies of Canada geese and used to nest abundantly in the prairie pothole region in which Ordway lies.

Because of encroachment on their habitats, the great birds had totally vanished from the area. Fortunately, the Sand Lake National Wildlife Refuge, located about 40 miles from the Ordway Prairie, supports a large captive flock of Canada geese. The flock is maintained specifically to replenish areas from which the birds have disappeared.

Paul Bultsma, preserve manager of the Ordway Prairie, said that the geese will be free-flying and free-migrating. The birds are all a year old, the age at which they are usually released, and will begin nesting when they are two or three years old. Since they inhabit the



islands and shorelines of lakes and potholes, the giant Canada geese now have abundant nesting and breeding sites on the Ordway Prairie's 400 separate wetlands.

Here is a list of my friends who would appreciate hearing of your efforts.

Name _____ (please print) Name _____ (please print)

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Enclosed is my contribution of \$ _____ to the General Fund of
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Your stamp on this envelope is an additional contribution to the Conservancy.

GEORGIA AND TEXAS... IN CONCERT

By Lynn Mohn

One week in April, International Paper Company made the largest and most valuable corporate land gift yet received through the American Land Trust program—Savannahs at Genesis Point, 26,000 acres valued at \$13 million. The same week, The Nature Conservancy concluded years of complex negotiations for an option on 25,000-acre Ossabaw Island, one of Georgia's eight great barrier islands. Ossabaw is valued at \$15 million.

The two areas are separated only by the Intracoastal Waterway, 20 miles south of Savannah, Georgia. Their near-simultaneous acquisition was purely coincidental. Together, the Trust and the Conservancy acquired the single most valuable conservation package in the history of either group. Totalling 51,000 acres, Ossabaw and Genesis Point contain extremely productive coastal marsh and tidal estuaries, and five endangered birds have been sighted. Both areas will be transferred to the State of Georgia for management.

Half a continent away, the same week, 500 people gathered in east Texas' Big Thicket, the "biological crossroads of North America." Nathaniel P. Reed, Honorary Chairman of the American Land Trust and former Assistant Secretary of the Interior, stepped up to the microphone and began the dedication of 2,138 acres of arid sandylands. Other spokesmen included officials from Time Inc. and its subsidiary Temple-Eastex—donors of the land—as well as the Trust, the Conservancy, and the Big Thicket Association. Mrs. Lyndon B. Johnson, a dedicated conservationist and Big Thicket supporter, also addressed the gathering.

A large wooden sign, which now stands at the preserve's entrance, was presented to Roy E. Larsen. It reads:

"ROY E. LARSEN NATURE TRAIL. This nature trail is dedicated to Roy E. Larsen for his outstanding contribution to the conservation of the natural world and the life it shelters."

Mr. Larsen is Vice Chairman of Time Inc., a Conservancy board member, a Trust national committeeman, and a life-long conservation advocate.

On Maryland's Chesapeake Bay, a bald eagle

nesting site has been saved with the help of the American Land Trust. Adjacent to the Blackwater National Wildlife Refuge, the 2,530-acre Jarrett Tract was purchased for \$1 million with a loan from New York Life Insurance Company, made feasible by the Trust's winning a \$50,000 grant from the Middendorf Foundation.

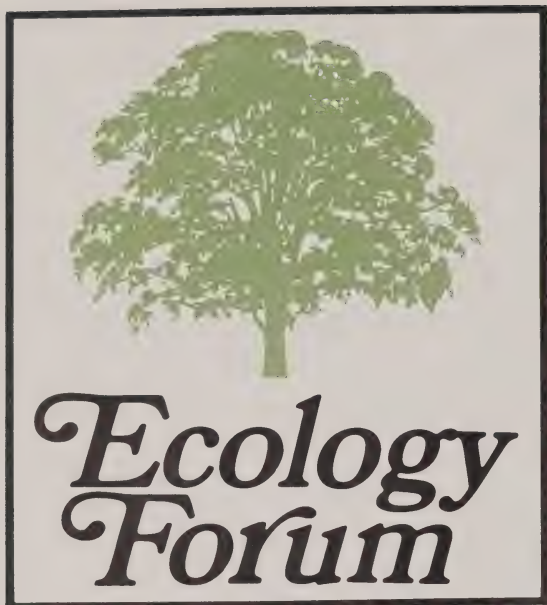
Two more corporate gifts have been made in Florida. Seaboard Coast Line Railroad added 176 acres to the Theodore Roosevelt Preserve, and Context Development Company gave 815 acres on Lake Orange under the Trust's auspices.

Additional financial support to the Trust has recently come from: Monsanto Fund, Field Enterprises, Fund for the Preservation of Wildlife and Natural Areas, Foundation for the Needs of Others, United Technologies, New England Telephone, Southern New England Telephone, Rockwell International, and ARCO Foundation. To kick off a public campaign to raise \$25,000, AMAX Foundation has made a 3-to-1 challenge grant of \$75,000 for the purchase of Big Walnut Valley, Indiana. Also, from an anonymous individual, the Conservancy received \$3.6 million to buy an additional 7,200 acres for Konza Prairie, designated by the Trust as its Kansas project.

By March 31, the National Council of State Garden Clubs—the Trust's volunteer arm—tallied \$100,286 in its first fund-raising contest. Cash awards for the most money given and the best promotional effort made went to the Deep South Region, the state federations of Florida, Massachusetts, Indiana, and Vermont, and three local clubs—Bartow Garden Club, Bartow, Florida; Rutland Garden Club, Rutland, Vermont; and Azalea Garden Club, Winter Haven, Florida. Forty separate fund-raising projects now enjoy National Council assistance. A second awards contest, from April 1, 1977, to March 31, 1978, should bring even more astounding results from this very enthusiastic group.

A great momentum was built during the American Land Trust's first year. Year Number Two promises to be even better.

Note: *Challenge to a Nation*, a 17-minute film on the American Land Trust, narrated by Hugh Downs, is available for free loan. Donors of \$10 or more to the Trust become Honorary Trustees and receive certificates suitable for framing. If not already Conservancy members, donors are granted one-year memberships including *News* subscriptions. Donations honoring others are welcome. Contributions, inquiries, and film requests should be mailed to: American Land Trust, P.O. Box 2076, Arlington, VA 22202. Executive Director: George S. Wills. Phone: (703) 841-5376. Donations are tax-deductible. Please make checks payable to The Nature Conservancy.



No. 23

By Paul G. Risser

Director, Oklahoma Biological Survey

PRAIRIE PRESERVES AS RESEARCH FACILITIES

There are many benefits to be derived from prairie preserves, but perhaps the most unrealized is that of research. The purpose of this Ecology Forum is to explore ways in which preserves, specifically prairie preserves, can be utilized in research and discuss ways in which this function can be encouraged.

At the outset, it is perhaps useful to set the stage by defining conditions and terms. Prairie preserves are pieces of landscape dominated by grassland biological communities, which are maintained and managed to approximate natural conditions. A whole spectrum of prairie types occurs across the country, including the mountain meadows, the vanishing true prairie, and the wide expanses of the western Great Basin. Research involves studious inquiry, usually with the aim of identifying new relationships and facts or revising accepted conclusions. There are a myriad of approaches used in research, ranging from large scale manipulative experimentation to theoretical considerations of old data reanalyzed in such a way that new conclusions emerge. It should be clear that there are many kinds of grasslands and, therefore, many kinds of research. The trick is to identify linkages between prairies and research that

provide useful information, while maintaining and enhancing the quality of the preserve.

There is an old concept in ecology called "succession." It means, in essence, that biological communities are dynamic and change over periods of time. In some instances, change occurs largely on an individual basis; that is, an individual goldenrod plant dies, but is replaced by a lupine. On another spot in the prairie, however, a lupine is replaced by a goldenrod.

These are short-term changes in the relative number of individuals of each species; but over the long-term, the species composition stays reasonably constant. These compositionally stable communities are referred to as climax, or terminal communities. In other situations, whole groups of species are replaced. For example, in the first few years after a field is abandoned, it may be dominated by weeds and annual grasses. This stage is then replaced by a group of climax perennial grasses and forbs. In moist environments, the grasses may not be the climax vegetation but may be replaced by shrubs and eventually a forest.

The process of succession is particularly germane to the present discussion of prairie preserves and research because of its importance to the preserve manager. If the grassland represented in the preserve is a successional one, it is imperative that the management plan for the preserve take cognizance of the natural progression of community types. For example, in the eastern tallgrass prairie region, a prairie preserve will naturally be invaded by shrubs and trees. A management plan, perhaps with periodic burning, is necessary. However, the answers to all these management questions are not known, and clearly research experience in the prairie preserves is essential.

On a more fundamental level, the actual processes of succession, many of which have been considered dogma for 40 years or more, are now being severely questioned. The conventional idea is that early stages alter the environmental conditions to the extent that the succeeding species are more competitive and eventually replace the previous occupants. However, there is now an emerging set of data which suggests that the early species may not be so important and that the composition of the ultimate climax community may be more a function of the initial conditions at the time of the disturbance. In other words, the species composition of the succeeding community may be a function of the species reproductive biology and the prevailing climatic and soil conditions, rather than changes that occur during the process of succession. The major point of this example, in addition to demonstrating that fundamental concepts are sometimes questioned, is that nowhere do we

have long-term records of successional sequences. Certainly record-keeping could and should be a function of prairie preserves.

Recent studies in ecosystem science have permitted us to draw some generalities about what happens to the nutrients and water in forested watersheds under both natural and manipulated conditions. Two points are of importance. First, few studies of this type have occurred in grasslands, so the unmanipulated control watershed can be a major role of the grassland preserve. Secondly, as these watershed studies progress, the ultimate explanation for their behavior will depend upon having access to a wide variety of watersheds, which are distinguished by a number of factors including topography, geological substrate, soils, and associated vegetation. Therefore, prairie preserves must be established across a wide range of these environmental conditions.

It has been said that the best research is done by a keen observer with a pencil and notepad. Whether or not this is really true, there *are* a tremendous number of significant and important problems that can be attacked by careful observation. For example, pollination ecology is rapidly developing into a robust field of science, complete with its own fascination. Basically the questions being asked are who pollinates whom, what are the mechanisms, and to what degree have the plants and their pollinators evolved together. Although there are some non-destructive manipulative techniques such as putting screens around plants to exclude insects, most of the work is simply keen observation. These studies also can be carried out on prairie preserves.

There are a number of other research areas that should be mentioned. Phenology is the description and analysis of when organisms reach certain stages in their annual life cycles. The most common example is observation of flowering-times in plants and these data are then combined and evaluated across large geographical areas. As another example, we are now asking questions about how big an area needs to be in order to maintain the flora and fauna. Clearly, comparing the sizes of a series of prairies with their species composition could provide the answers. As another example, the species composition of a prairie is a function of the prevailing environmental conditions. Man is changing these conditions by altering rainfall patterns and by adding chemicals to the atmosphere. Periodic sampling of the species composition of prairie preserves can be used as a biological monitor to predict some of the consequences of these actions.

The above paragraphs have briefly described a number of important research areas that are com-

patible with prairie preserves. There are many others. A cautionary note is in order—namely that anytime scientists use the preserves, care must be taken to insure that the integrity of the prairie is not imperiled. Therefore, three conditions must be satisfied to encourage the use of prairie preserves as research facilities and to obtain the greatest benefits from these activities. First, it must be ascertained that the research activity is compatible with the preservation objective. Second, background or baseline information for the sites must be available or be made available. Third, a wide array of grassland types must be preserved to maintain our research options for various environmental and biological conditions. In addition to being part of our natural heritage, in a research sense, these prairie preserves may eventually be the only experimental controls by which we can monitor the effects of our manipulative activities.

William E. Howard

William E. Howard, member of the Conservancy's Board of Governors, died on March 30, 1977. Mr. Howard, who graduated from the University of Delaware, began his banking career in 1924. Upon retiring in 1969 as senior vice president and head of Mellon Bank's Metropolitan Department, he became president of the Columbia Corporation, Pittsburgh. At the time of his death, he was also a director of the O. Hommel Co., Kennametal Inc., the H.H. Robertson Co., Union Title Guaranty Co., treasurer and member of the executive committee of the Western Pennsylvania Conservancy, and a member of various boards of charitable, philanthropic, and educational organizations. Elected to the Board of Governors in 1968, Mr. Howard served as vice chairman in 1971, and was re-elected in 1972 and 1976.

IF YOU MOVE...

Please immediately notify the Membership Department of the National Office of your new address if you move. The Post Office does not forward third class mail and we would like to insure that your receipt of the *News* is not interrupted.

PHOTOGRAPHS: Susan Bournique, pp. 8, 11, 15 (top); Jim Brandenburg, pp. 13, 14, 18 (bottom), 19, 22-23; Patricia Duncan, p. 23, inside back cover; Lloyd Hulbert, p. 18 (top); Dr. Herbert Lamp, p. 21; Tim Loomis, p. 4; R. Newell Searle, p. 15 (bottom).

1977 ANNUAL MEETING

October 20-22 • Charleston, South Carolina

The Conservancy's 1977 Annual Meeting will treat members to an especially interesting and informative 3-day program featuring the progress of The Nature Conservancy in the protection of unique areas of land, results of the State Heritage Programs, and the exciting program of the American Land Trust.

The meeting will be held in Charleston, South Carolina, on October 20 to 22, 1977. The charm of Charleston, its historical attractions, recreational facilities, and climate make the city a perfect choice. It is near two of the Conservancy's outstanding projects, the Santee Coastal Reserve and the Four Holes Swamp. Both areas will be visited on field trips. The State of South Carolina was one of the first states to undertake a cooperative Heritage Program with the Conservancy.

Please make your reservations early and join us in Charleston on October 20.

TENTATIVE REGISTRATION FORM

Please return this form to The Nature Conservancy, Annual Meeting Registrar, 1800 N. Kent Street, Arlington VA 22209, as soon as possible. Attendance at all events cannot be guaranteed for registrations received after July 6, 1977. On receipt of your registration, details and additional information will be mailed to you.

Space is limited and consequently registrations will be accepted in order of receipt of check.

Name _____

Address _____

(Zip Code)

Chapter _____

Arrival Date _____ Departure Date _____

Please check your membership classification:

☐ Conservancy Member ☐ Board Member ☐ Chapter Representative ☐ Chapter Chairperson

Deadline for registration: September 7, 1977. No refunds after September 7, 1977

The registration fee is \$75.00. You will be the guest of several members for four occasions. Fee includes all costs except hotel room, breakfasts, and lunch on Thursday.

Please indicate on the following page the events you plan to attend.

Accommodations:

Mills Hyatt House — Headquarters

Single \$34/Double \$40

Other nearby hotels

From \$10 to \$25

Golden Eagle Motor Hotel — 4 camper sites available

From \$3 to \$5.75

Complete details and hotel reservation cards will be sent on receipt of your registration.

Climate: Average temperature range in October is 67-75 degrees. Percent of sunshine is 75.2.

For evening occasions, long or short dinner dress for ladies; coats and ties for gentlemen.

1977 ANNUAL MEETING

October 20-22 • Charleston, South Carolina

TENTATIVE SCHEDULE

Wednesday, October 19 (for early arrivals)

5:00-7:00 PM Registration — Mills Hyatt House, Meeting & Queen Streets

Guided tours of historic Charleston by private car with visits to several homes and gardens may be arranged for any time before or after the meeting through Mrs. I. Mayo Reed, 103 Tradd Street, Charleston, South Carolina 29401, (803) 722-8539. \$10 per hour.

Guided tours of the Marine Resources Center may be arranged for any time before or after the meeting by writing the Director, Dr. Edwin B. Joseph, Box 12559, Charleston, South Carolina 29412. No charge. The Center is at Fort Johnson on Charleston Harbor, about 20 minutes by car or taxi from the Mills Hyatt House.

A limited number of float trips in Four Holes Sanctuary-Francis Beidler Forest may be arranged before or after the meeting by contacting Tim McCall at the Conservancy's Atlanta office, 148 International Blvd., NE, #450, Atlanta, GA 30303, (404) 659-0240.

Thursday, October 20

9:00-11:00 AM Registration — Mills Hyatt House

Please check whether you would prefer to take Tour A or B on Thursday and those events you plan to attend thereafter. Your \$75 registration fee covers them all.

TOUR A ☐

9:00-11:00 AM Guided walking tour of historic Charleston leaving from Mills Hyatt House

Lunch on your own

12:30 PM Bus trip to and guided tour of Four Holes Sanctuary-Francis Beidler Forest, one of the last primeval blackwater swamps

4:00 PM Return by bus

TOUR B ☐

Note: Tour B is limited to 50 people. Please check here ☐ if you wish to take Tour A in the event that Tour B is already filled.

8:30 AM Depart by bus for South Carolina Marine Resources Center

9:00 AM Tour of Center

11:00 AM Boat trip to Capers Island, a classic barrier island; picnic lunch and guided tour

3:00 PM Return by boat to Marine Resources Center

4:30 PM Return by bus

6:45 PM ☐ Cocktails—Hibernian Hall, 105 Meeting Street, an historic building of 1841, adjacent to Mills Hyatt House

7:30 PM ☐ Awards Dinner — Hibernian Hall

Welcome by the Governor of South Carolina, The Honorable James B. Edwards

Introduction of Mr. Joseph B. Hudson, South Carolina State Heritage Commissioner; and the Board of Governors of The Nature Conservancy
Presentation of 1976 Oak Leaf Awards, President's Stewardship, and Chapter Awards

Friday, October 21

8:45 AM ☐ Depart by bus for Santee Coastal Reserve — 23,000 acres of cypress trees, salt and freshwater marshes, habitat of bald eagles, osprey, egrets, and other wildfowl

12:30 PM Shellfish picnic, as guests of the South Carolina Wildlife and Marine Resources Department

3:30 PM Return to hotel

4:30-5:30 PM ☐ Presentation by a panel of members of prize-winning chapter projects, old and new, with slides and descriptions — Mills Hyatt House

7:00 PM ☐ Cocktails — Colony House, 35 Prioleau Street

7:45 PM ☐ Dinner at Colony House, an old Charleston restaurant.

Saturday, October 22

8:45-10:45 AM ☐ Annual Business Meeting

Mr. William D. Blair, Jr., Chairman of the Board of Governors, presiding
Election of Officers

Report by Mr. Patrick F. Noonan, President, The Nature Conservancy. Illustrated with slides of new projects and programs

11:00 AM ☐ Departure by bus from Mills Hyatt House for Drayton Hall, an historic house owned by the National Trust for Historic Preservation

12:30 PM Depart Drayton Hall

12:45 PM Arrive Middleton Place. Oldest landscaped gardens in America

1:00 PM Picnic lunch under the live oaks

2:00 PM Tour of Middleton Place and gardens

4:00 PM Return to Mills Hyatt House

6:30 PM Cocktails as guests of Mrs. W. L. Lyons Brown and Mrs. Thomas M. Waller — South Carolina Society Hall, 72 Meeting Street

7:30 PM ☐ Annual Meeting Dinner — Mills Hyatt House

Guest Speakers: The Honorable Cecil Andrus, Secretary of the Interior; The Honorable Joseph Riley, Jr., Mayor of Charleston; and The Honorable Nathaniel P. Reed, Honorary Chairman, the American Land Trust

MAKE A WILL—LEAVE A LEGACY

Will you automatically inherit your spouse's share of your joint estate? That would be simple and nice, but it doesn't necessarily happen that way. Only through a will containing specific instructions can anyone insure that cherished personal effects won't end up in the window of a second-hand store. Without a carefully drawn will, your estate could be distributed contrary to your wishes, according to the laws of your state of residence—even to the extent of determining the guardians of children.

Every man and every woman—not just the elderly, not just the wealthy, not just the breadwinner—should execute a will with the help of an attorney, which reflects his or her current wishes in detail. If you protest that your estate is too small to bother with preparing a will, take warning from the American Bankers Association: "... no estate is too small to plan and 'package up' for the future." Everything you own of value—house, cars, life insurance, current value of securities, checking and savings accounts, jewelry, and even the value of your retirement fund—will add up to the total on which the Internal Revenue Service will place a value for taxing purposes.

Consider carefully with an attorney how to utilize federal tax laws to substantially minimize estate taxes. For example, a bequest to The Nature Conservancy will be deducted from your estate *before* taxes. In most cases, this not only lowers your taxes substantially, but also provides you with the pleasure of knowing that you have made a lasting contribution to the protection of priceless natural land.

Bequests to the Conservancy are administered precisely as you direct. Proceeds not specifically designated are placed in the Conservancy's General Fund, where they will underwrite our land preservation program.

The Nature Conservancy hopes that, in reviewing your plans for yourself and your family, you will remember us—and our important goals. If you would like further information on the subject of wills and bequests, we will be happy to furnish more material or to discuss these matters with you on a totally confidential basis. If you wish, the following clause can simply be incorporated into your will to insure a gift to The Nature Conservancy:

"I hereby give, devise, and bequeath to The Nature Conservancy, a nonprofit, educational, scientific, and charitable institution, incorporated in the District of Columbia, and now of 1800 N. Kent Street, Arlington, Virginia, the sum of _____ dollars, to be used for the Conservancy's general purposes and objectives."

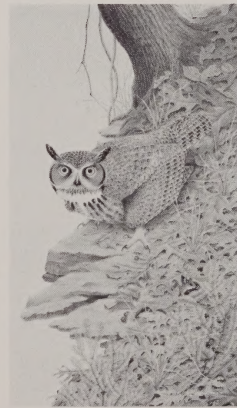
EUGENE ODUM RECEIVES TOP ECOLOGY AWARD

Last month, Dr. Eugene P. Odum, member of the Conservancy's Board of Governors and the nation's foremost ecologist, was awarded ecology's highest honor, the Pepperdine University Tyler Ecology Award. In a White House ceremony, President Carter presented Dr. Odum the award and a check for \$150,000, which is given with the prize. The Tyler Award is given annually to the person who has done the most to improve the environment.

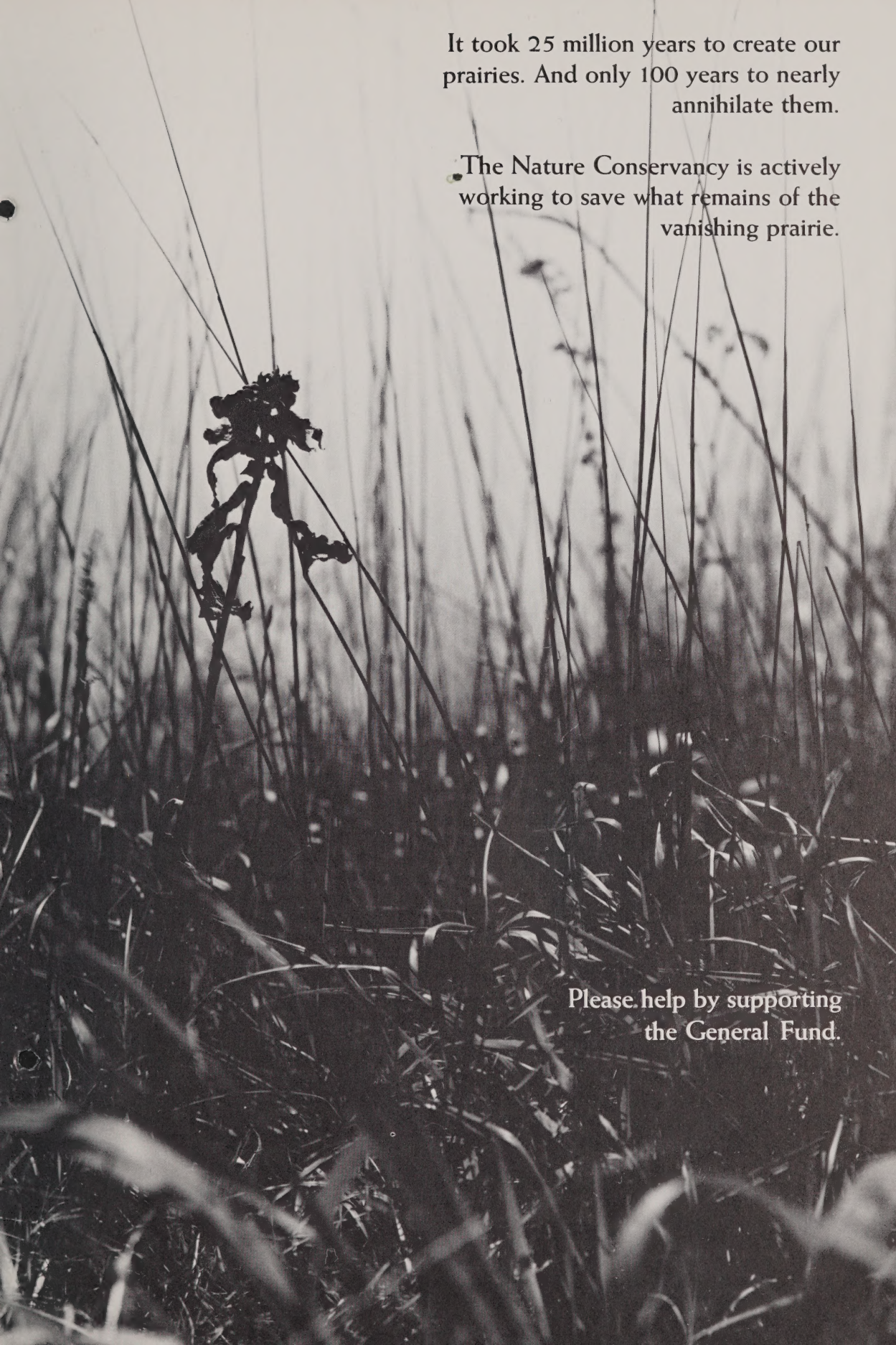
Presently the Callaway Distinguished Professor and Director of the Institute of Ecology at the University of Georgia, Dr. Odum received the Prix de l'Institut de la Vie in Paris in 1975, along with his brother, Howard Odum. Both the Prix and the Tyler award are considered by many to be equivalent to the Nobel Prize in ecology. Dr. Ruth Patrick, noted limnologist and also a member of the Board of Governors, received the Tyler Award last year.

In a career spanning well over 35 years, Eugene Odum has contributed to all areas of ecological research. His book, *Fundamentals of Ecology*, became the most widely used text on ecology and was translated into many languages. His early research on the ecology of salt marshes provided the first knowledge of estuarine ecosystems.

PRINTS STILL AVAILABLE



Prints of the painting of the great horned owl by wildlife artist William Zimmerman are still being sold at \$50 apiece to raise the remaining funds (\$25,000) needed to complete the purchase of Big Walnut Valley in Indiana. Mr. Zimmerman was commissioned by AMAX, Inc., which provided a grant of \$75,000 toward the \$100,000 purchase-price of the valley. The artist contributed the entire edition of 500 signed and numbered prints that were made of the painting. Each gift of \$50 to save Big Walnut Valley produces a \$150 gift from AMAX, Inc., and the donor receives one of the 14" x 24" color prints. Only 100 of the prints remain. If you wish to obtain one, please mail a check for \$50 or more, made payable to The Nature Conservancy, to: Indiana Chapter, The Nature Conservancy, Route #1, Nashville, Indiana 47448. (Please note: Only the amount of a gift above and beyond \$50 [the value of the print] qualifies as tax-deductible.



It took 25 million years to create our
prairies. And only 100 years to nearly
annihilate them.

The Nature Conservancy is actively
working to save what remains of the
vanishing prairie.

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1977 ANNUAL MEETING
October 20-22 • Charleston, South Carolina

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